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ended, was dismissed out of the bagnio of the island S. He asked the warden to be retained, because he did not know how to get food and shelter. His demand being refused, he opened his bowels with the handle of a spoon, went to bed as usual, and died without even a sigh. Mandrin, a criminal, shortly before his execution allowed himself to be cut in eight places without giving a sign of pain ; criminal R. flayed the skin of his face with a piece of glass. In the penitentiary at Chatham during the years 1871 and 1872, 841 voluntary wounds and injuries were made. Among them 27 convicts had mutilated some limb, and in 17 cases the limb had to be amputated.

This obtusity of the sensory organs in criminals is supposed to be of a cortical origin and being similar to the phenomena of savage life is interpreted as atavism. Criminals show deficiencies in the senses of touch, smell, taste, and hearing, but not of sight. And this is analogous to the savage in whom the sense of sight is naturally very strong, and no criminal could execute numerous thefts or escape the arm of justice without a high development of the sense of sight.

In the second article on comparisons of tone-distances Gustav Engel, Professor at the Royal High-school of Music in Berlin, takes occasion to explain his views of the subject with reference to the severe criticism of C. Stumpf on Carl Lorenz's theory. Wilhelm Wundt had taken part in the discussion in favor of Lorenz. The subject of the article lies in the border-land between the physiology of hearing and music ; and Professor Engel comes to the conclusion that affinity of tones, i. e. the interval-sense in a melodious succession does not lead to the same accuracy and reliability of hearing as their concord. He objects to the idea of an arithmetical difference as proposed by Lorenz and Wundt, and proves it through the fact that the Pythagorean tierce in the unaccompanied scale makes a less noticeable disturbance than in a concord, while the approximately pure tierce (which is too low only by a small fracture of a comma) is excellent in the concord while it causes a slight disturbance in the melody. Musical intervals are not identical with the geometrical intervals, yet they are based upon them as a selection made among innumerable possibilities for certain purposes. Their acceptance is established only in harmonic music, but this fact too adds some difficulties to the investigations made in this field, for if two tones sound together, we can no longer distinguish them separately, as would be required for the investigation ; and if we let the one succeed the other their geometrical relation is no longer discerned with the same precision. (Hamburg and Leipsic : Leopold Voss.) κρς.

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Prof. H. Höffding's article on psychical and physical activity is an answer to a criticism by Professor Kroman. Professor Höffding had proposed, concerning the relation of the psychical to the physical, a theory which he called the "identity hypothesis," according to which the physical and psychical activities are not different in their nature but only in their phenomenal appearance. K. Kroman, a countryman and colleague of H. Höffding—both are professors at the University of Copenhagen—rejected in his recent work "Logic and Psychology" the identity hypothesis and characterised it as "Duplicism," a name against which Höffding protests. Kroman's objections are as follows : *a*) Natural science knows of no reason to conceive of the relation of the psychical to the material in the way expressed by the identity-hypothesis. *b*) On the basis of the identity-hypothesis it remains unexplained how we can know anything about the external world. *c*) It is inexplicable how an identity can obtain of two so different things as are the bodily multiplicity and the psychical unity. Professor Höffding investigates these three objections separately and comes to the conclusion that his identity-hypothesis shows the relation between the psychical and material nature in a clear and simple light. It excludes on the one hand materialism and on the other hand spiritualism. The question whether either phenomenon, spirit or matter, represents the absolute nature of existence, cannot, according to Höffding, be answered. It appears to us that Professor Höffding's position is sound in all main points and may be considered as that view which is most prevalent among modern psychologists. However, concerning the question whether spirit or matter represents the absolute nature of existence, we refer the reader to the editorial article "Are there Things in Themselves ? " section XII, "The Oneness of Subjectivity and Objectivity." In our opinion the question itself is illegitimate. Neither the subjectivity of spirit, nor the objectivity of matter represents the absolute nature of existence ; both together form the nature of existence ; and we omit here the word "absolute" purposely. The question as to which abstract, matter or spirit, represents the absolute nature of existence seems to us similar to the question which of the two terms A and B represents in the relation $A : B$ the absolute nature of the relation. The obvious answer is neither.

The eighth article of A. Marty of Prague on Language-reflex is mainly of a controversial nature directed against L. Tobler's article on the origin of language in the *Zeitschrift für Völker-Psychologie.* By Nativism, Marty understands the theory that certain involuntary articulate sounds are associated with certain ideas, while the so-called empirical theory attempts to explain the origin of the first words without such innate mechanical relations between sounds and concepts. Marty represents the empirical solution of the problem and objects to the extreme nativism, but he grants that Tobler's modified nativism approaches very much to his own position.

The longest article of the present number (63 pp.) is an essay full of valuable hints by Chr. v. Ehrenfels on the Philosophy of Mathematics. The epistemological basis of mathematics demands a psychological investigation of its contents. Accordingly the author proposes to present a psychological characterisation of the number-conceptions, from which he derives some conclusions concerning the theory of cognition. He investigates the origin of the unity conception which is generally defined as "positing a unit" or as "conceiving as a unit." We usually believe that we abstract numbers directly from the objects, when we look for instance at one house with two doors and five windows. But this process of abstraction is not quite so direct as it seems. The number-conception is not taken from external observation, but carried into the same; yet this is done involuntarily and inadvertently so that it appears as if they were *eo ipso* contained in it.

What is the origin of the concepts "unity" and "multiplicity"? Two methods present themselves: 1) The concentration of attention and (2) the act of bringing into relation. The former produces a unity and, when successively directed to several objects, a series of units. The latter appears to be required by the consideration that the conception of a number is conditioned by acts of distinguishing. The number "two" requires two acts of distinguishing, "three" requires three, "four" requires six and the number n requires $\frac{n}{2}(n-1)$ acts of distinguishing. This explains why we can have clear and direct conceptions only of very low figures. The idea that a combination of both methods will explain the facts is by no means excluded. But there is a third source which may be used to explain the unity conception, viz. inner experience. "The unity of consciousness," Ehrenfels says, "has been misused in philosophy to demonstrate the substantiality, simplicity, and indestructibility of the soul." Nevertheless there is some truth in the unity idea, for the present psychical phenomena present themselves in a peculiar amalgamation, which admits of a comparison between two elements while it erects a barrier between the *ego* and the *tu*. Our psychical contents will always appear to us as a unit; and on this basis we might declare that the unity conception is derived from this source. [Here Ehrenfels does not see that the concentration of attention is practically the same as the unity of consciousness, for attention means consciousness, and concentration produces unity.]

Number-conceptions originate by counting. We disjoin things; for instance, we throw a number of apples into a basket, or we let the finger slide over the division lines of a measuring stick naming each unit while proceeding in the act. From such processes the function of counting can be abstracted while the details are neglected as unimportant. Most of the higher numbers are never directly but only indirectly realised. So for instance twenty is to many that number which will be reached by counting up to twenty, yet the single units of the number are lost sight of entirely. Such number-conceptions belong to the class of "indirect concepts" which represent objects not through marks belonging to the object itself, but originating through its relation to other objects. The basis of such indirect concepts had been called by Ehrenfels *Gestaltsqualitäten*, i. e. figure qualities, and by Meinong *fundirte Inhalte* or founded contents. Thus indirect conceptions are parts contingent upon some such basis.

Number-conceptions are not always clearly thought out and there are some helps to represent higher or more complex numbers. Thus we can think of ten as represented by the outside and inside corners of a pentagram, twelve as the edges of a cube, etc., and common among all nations is the usage of the fingers to represent numbers up to ten. Such helps are quite different from indirect number-conceptions and may be called figurative number-conceptions.

That there are mathematical conceptions of magnitudes which have no objective analogon is quite natural, for there is even in an indirect conception no warrant for its objective reality ; and we ought to consider how many word- and idea-combinations are possible without their possessing some analogous reality. Yet the so-called irrational cannot properly be called a number, it is the demand of a number which in fractions can sufficiently for certain purposes but never fully be realised.

Negative numbers always presuppose a contrast and such conditions arise naturally wherever the fundamental ideas imply two opposite directions, for instance past and future in time, credit and debit in business, etc. It is a matter of course that there are in reality as little either positive or negative numbers, as there are positive or negative colors or sounds.

Concerning the necessity idea, Ehrenfels says: "Nobody will consider it as possible that five plus seven will in some cases make any other number than twelve. We are confident that the same addition will under all circumstances yield the same sum. Ehrenfels grants the psychical certitude of this but not the mathematical, and thinks that on this point there is a difference of opinion allowable. Here we disagree from Ehrenfels and refer the reader to former articles on kindred subjects in *The Monist*, especially the article on "The Origin of Thought-forms," Vol. II, p. 111. We must bear in mind that in mathematics we are moving in a realm of pure forms and the statement $7 + 5 = 12$ is, as the Germans express it, *eindeutig bestimmt*, i. e. it is determined exhaustively in one and the only one possible way. The numbers 7 and 5 being rigid, their sum and their product will also be rigid.

This difference of opinion may be contingent upon a difference of the conception of the *a priori*. Ehrenfels defines as "a priori" such judgments which having come into our possession, are readily accepted without proof. We follow Grassmann in rejecting the acceptance of anything without proof, including the idea of mathematical axioms. The *a priori* in our terminology becomes identical with that which pertains to formal thought; and it would make no difference whether the instance presented is as simple as $1 + 1 = 2$ or extremely complex as are the differential calculus and logarithms. Accordingly we disagree also from Ehrenfels when he finds even in such additions as for instance $825 + 217 = 1042$ vestiges of an *a posteriori* character. The employment of the logarithms accordingly appears to Ehrenfels also *aposterioristic* because the fruits of other peoples' labors are utilised!

Concerning John Stuart Mill's view of the subject, Ehrenfels says that "it is still deeply entangled in the errors of that conception which it so bitterly opposes, viz. in the formalism of the old purely *a priori* conception. For only he who adheres to the view that all mathematics are deduced from a few axioms can think of attributing to those axioms the highest degree of plausibility which is assumed for them on the ground of comprehensive deduction." We agree with Ehrenfels's objection to Mill, but we cannot agree with his view that mathematics derives any elements from *a posteriori* elements, although we grant that quite new departments are created simply by a different employment of certain functions. Accordingly mathematics cannot be derived from a few axioms only but is the products of certain functions.

Ehrenfels calls attention to the fact that the mathematician operating with symbols often forgets entirely what he has to think of in connection with these symbols. "This is not strange," he adds, "for thoughtless word-combinations present analogous instances, yet it is strange that the result almost without exception comes out right; *es stimmt!*" We object here; operations with mathematical symbols are not thoughtless combinations, at least, they are not meaningless. They are operations not with things, but with symbols representing certain relations among things. When gamblers play with chips representing real money, they need not think during the game of the value represented by a chip, and yet when the account is made, the result attained with the assistance of the chips will come out right. There is no reason to wonder at it. Chips like mathematical symbols might in a certain sense be called thoughtless, for certainly they do not think ; but they are not thoughtless in the sense that they are meaningless, that nothing is thought by them.

Ehrenfels apparently sees a problem where there is none and this is closely connected with another point. He looks upon the mathematician's inability of thinking out in every respect the objective meaning of mathematical symbols as a shortcoming of man's intellect. While it appears that we cannot think anything by many mathematical symbols (for instance by $a^0 = 1$) except the symbol itself, the enormous success of mathematical thought is evidence that they must have some definite meaning although it is to be excogitated only by those beings who will transgress the average intelligence of to-day, the first germs of whose existence are the mathematical geniuses of the present generation. It appears to us that undoubtedly every mathematical symbol has a definite meaning, representing the result of some function. That the result will sometimes be unattainable or unrealisable, that especially all operations with zero make the whole calculation indefinite (which naturally arises from the nature of zero) does not alter the truth of this proposition in the least.

We have to make one additional remark. The peculiarity of mathematics that we do not throughout our operations think out the meaning of the symbols is not a shortcoming of our intelligence, but the strength of mathematical science. The advantage of all the formal sciences and especially of mathematics consists in this that we *need not* think out every detail, but that we can, through the assistance of mathematical symbols, perform the most intricate operations with machine-like exactness. The economy of thought produced in this way is not a deficiency of man's mind, but a virtue.

Prof. H. Höffding (in No. 4) insists upon the causal law as being indispensable in psychology. There are some people and among others his colleague Professor Kroman who regard moral motives as an exception. "Yet," says Professor Höffding, "should the decisive moment of a decision not be determined by the causal law, the will could never be determined through a reflection on the possible effects of the action and thus every reason would be missing to attribute to man any responsibility."

E. Grosse expatiates on the proposition to apply the comparative method of ethnology to æsthetics. Ferd. Rosenberger proposes the following programme : "Knowledge is power ; activity based upon such power is the cause of happiness. Therefore with the increase of knowledge, there is an increase of happiness, successful activity however is impossible without virtue. Therefore we conclude that an increase of happiness will be accompanied with an increase of virtue." A. Marty in this his ninth article blames Steinthal for having misrepresented the eighteenth century theories of the origin of language.

M. Offner reviews Dr. Charles Richet's reports of his telepathic experiments, but the reviewer cannot assent to Richet's opinion "that these facts possess a strange coincidence and that they are, probably, the result of a relation and not of pure chance." (Leipsic : O. R. Reisland.) κρς.